

## **TROPICAL RAINFALL MEASURING MISSION**

**September 25, 2000 – October 1, 2000**

**DOY 269 - 275**

**Day of Mission 1033 - 1039**

### **TRMM MISSION OPERATIONS**

- TRMM is flying in the -X Forward direction as of October 1st (00-275) at 08:51:45z.
- Yaw maneuver #48 is scheduled for October 30th (00-304).
- Delta-V #232 is scheduled for October 4th (00-278), using the ISP thrusters.
- The Beta angle range for 00-276 to 00-282 is  $-2.1^{\circ}$  to  $-32.8^{\circ}$ .
- The next Monthly Status Review (MSR) is scheduled for October 4th (00-278).
- The next End of Life Planning meeting is scheduled for October 25th (00-299).
- The next Flight Software CCB meeting is scheduled for October 3rd (00-277).
- 92 days remain until Extended Mission science operations begin on January 1st, 2001.

### **TRMM SUBSYSTEM OPERATIONS**

#### **Attitude Control System (ACS)**

00-269 (Monday, September 25th)

Delta-V maneuver #229 was successfully conducted at 15:24:27z and 16:10:13z for durations of 41.750 and 19.125 seconds respectively, using the LBS thrusters. The off-modulation of the +Pitch thruster (#2) for burn 1 and 2 was 24.6% and 18.3% (75.4% and 81.7% on time). The off-modulation of the -Yaw thruster (#1) for burn 1 was 1.7% (91.3% on time). The remaining fuel is 525.713 kg, and the final apogee and perigee height is 354.73 km x 347.49 km.

00-272 (Thursday, September 28th)

Delta-V maneuver #230 was successfully conducted at 15:00:58z and 15:46:46z for durations of 43.625 and 20.0 seconds respectively, using the LBS thrusters. The off-modulation of the +Pitch thruster (#2) for burn 1 and 2 was 23.2% and 17.5% (76.8% and 82.5% on time). The off-modulation of the -Yaw thruster (#1) for burn 1 was 8.3% (91.7% on time). The remaining fuel is 524.180 kg, and the final apogee and perigee height is 354.74 km x 347.51 km.

Yaw Maneuver #47 ( $180^{\circ}$  from +X to -X forward) was successfully performed on 00-275 at 08:51:45z.

00-275 (Sunday, October 1st)

Delta-V maneuver #231 was successfully conducted at 16:07:00z and 16:52:50z for durations of 44.5 and 21.5 seconds respectively, using the ISP thrusters. The off-modulation of the -Pitch thruster (#6) for burn 1 and 2 was 36.2% and 37.2% (63.8% and 62.8% on time). The remaining fuel is 523.66 kg, and the final apogee and perigee height is 354.73 km x 347.49 km.

#### **Flight Data System (FDS)/Command & Data Handling (C&DH)**

The UTCF was adjusted by  $-884\ \mu\text{s}$  on 00-272 and is now 31535996.838375 seconds with a current drift value of  $-278\ \mu\text{s}$ . The frequency standard offset remains x'7a2' with a current drift rate of  $-3.9\ \mu\text{s/hr}$ .

During 1/4 kbps events, the normal flight status event buffer dumps are not completing. This problem is attributed to bandwidth limitations at these low data rates, since there are now two additional packets (PSIB-B) telemetered to the ground. Analysis is being conducted to determine whether a telemetry output jam command or an actual filter table change would be the preferred method to reduce the quantity of telemetered PSIB-A packets in order to receive complete buffer dumps.

### **Reaction Control Subsystem (RCS)**

The RCS subsystem performed nominally during this period. See the ACS section for specific Delta-V information.

### **Power Subsystem**

The Power Subsystem continues to operate nominally in the Peak Power Tracking mode with a voltage-temperature threshold of  $VT=4$ . The spacecraft was able to transition through the zero solar beta angle without requiring a change to  $VT=5$ . All PSIB telemetry remains stable as reported last week, with all PSIB-A telemetry monitors disabled. The essential bus low voltage threshold for Low Power Mode loadshed was increased from 24.0 to 24.7 volts on 00-273, and the low state of charge monitors using PSIB-B telemetry were also re-enabled that same day. The PSIB-B patch was successfully installed on 00-272 which restores filtered battery 2 differential voltage telemetry and fixes the timer subroutines which were first discovered to be in error in May of 1999 (AR #73).

Additional telemetry such as ACE and spacecraft microprocessor currents are being trended and their profiles compared with the essential bus voltage to determine the best monitor to replace the essential bus voltage in the event that PSIB-B experiences further telemetry degradation. Also, the monitors which take the batteries off-line following a high battery temperature detection will be modified to keep the batteries on-line, but perform a loadshed and a change to  $VT=3$  instead.

The power subsystem will continue to operate in the Peak Power Tracking mode until the faulty PSIB-B cell voltage telemetry can be satisfactorily explained and proven to be unrelated to the problems with PSIB-A. Components are being collected and a test plan is being finalized which will help answer this question. Once it is deemed safe that the command pathways to the SPRU via either PSIB are not in jeopardy, then the decision will probably be made to return to the Constant Current Mode (CCM-2). This will limit the current into the batteries to 12 amps each and thereby reduce the chances of any future problems with battery 2 cell 1. This cell has shown that it is more sensitive to higher battery charge currents by displaying higher voltage levels than all the other cells.

Unfortunately, the battery 2 cell 1 voltage telemetry can no longer be directly monitored. One way to know whether more serious problems are developing with this cell is to monitor for any noticeable changes in the differential battery voltage. The Flight Software team is developing new on-board monitor points which will notify the ground if specified differential thresholds are

reached. In addition, alternate operational strategies are being considered in the event that PPT will become the permanent mode of operation, such as off-pointing the solar arrays, modifying the daily command loads so that CCM will only be in effect during small portions of each orbit, or some combination.

### **Electrical Subsystem**

The Electrical subsystem performed nominally during this period.

### **Thermal Subsystem**

The Thermal subsystem performed nominally during this period.

### **Deployables Subsystem**

The Deployables subsystem performed nominally during this period.

### **RF/Communications Subsystem**

The RF/Communications subsystem performed nominally during this period.

## **SPACECRAFT INSTRUMENTS**

### **CERES**

CERES remains powered OFF, following the original PSIB anomaly loadshed on 00-261.

### **LIS**

The LIS instrument performed nominally during this period.

### **PR**

The PR instrument performed nominally during this period. A Logampcheck Command Request was performed on September 27th (00-271) which cycles through the PR attenuation levels.

The list of Internal Calibration times over Australia in which PR was not radiating is shown below:

2000-269/04:34:51 - 04:37:01z  
2000-270/03:23:25 - 03:25:39z  
2000-271/01:00:00 - 01:05:02z  
2000-271/03:46:10 - 03:48:18z  
2000-271/20:04:28 - 20:06:29z  
2000-272/02:34:26 - 02:36:40z  
2000-272/18:54:57 - 18:56:36z  
2000-273/02:57:06 - 02:59:12z  
2000-274/01:45:47 - 01:47:58z

2000-274/18:04:33 - 18:08:26z  
2000-275/02:08:11 - 02:10:19z

## **TMI**

The TMI instrument performed nominally during this period.

## **VIRS**

The VIRS instrument performed nominally during this period.

## **GROUND SYSTEM**

No new ground system issues occurred during this period.

## **Event Reports**

### **ER #206: Faulty FDF Products Delivered**

On September 26th (00-270), FDF called the MOC at approximately 15:00z and notified the FOT that the products which had been delivered earlier that day were not correct. The daily EPV had already been uplinked to the spacecraft and was scheduled to begin propagating at 20:00z. Once the new products were delivered, the on-board EPV was stopped at 16:25z, the new EPV was uplinked and started, and it began propagating without any problems at 20:00z.

### **ER #207: New TMM Reset Constraint**

On September 25th (00-269), as part of the PSIB anomaly recovery to restore future loadshed capability, the standard commands were sent to reset and re-enable the Thermistor Monitor Module (TMM) boards. In this instance, however, the two reset and two enable commands were sent separately. As a result, all thermistor temperature limits briefly railed high following the reset until the enable commands were received. The resulting high temperature readings tripped the first threshold of the high gain antenna temperature monitor (no action occurs). There is now a new constraint to always send the four TMM reset and enable commands together, to avoid the chance of any false monitor detection triggers.

### **ER #208: Telemetry Dropouts Required Data Re-transmission**

On September 27th (00-271), the TDW/SSA1 13:36z event experienced temporary data dropouts which were later attributed to line problems external to the MOC (TTR #22974). All data was recovered later in the same event.

## **Generic Late Acquisition Reports (for TTRs 19639)**

#71: 00-270/02:14:37z; TDW/SSA-1; 2 minute 37 seconds late AOS.

## **New Anomalies**

No new Anomalies occurred during this period.

**Recurring/Open Anomalies**

No open anomalies recurred during this period.

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